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certain time, the solution for this part of the motion is

$$x = \frac{Ma_1' - F}{2\rho g} \left[ \cosh t \sqrt{\frac{2\rho g}{M + m' + mk^2/r^2}} - 1 \right].$$

If, at the instant  $t = t_1$ ,  $a_1$  changes to the constant value  $a_1''$ , the solution for the ensuing motion is

$$x = \frac{Ma_1' - F}{2\rho g} \left[ \cosh t \sqrt{\frac{2\rho g}{M + m' + mk^2/r^2}} - 1 \right] \\ + M \frac{(a_1'' - a_1')}{2\rho g} \left[ \cosh (t - t_1) \sqrt{\frac{2\rho g}{M + m' + mk^2/r^2}} - 1 \right].$$

Professor Huntington's case 1 was also solved by C. C. WYLIE.

**2863 [1920, 482]. Proposed by A. A. BENNETT, University of Texas.**

From their generation as roulette curves, show that the two hypocycloids of five cusps drawn with common vertices, are such that each is the envelope of a chord of constant length suitably placed upon the other.

Show that for any odd prime  $p$ , the  $(p - 1)/2$  distinct  $p$ -cusped hypocycloids with common vertices may be arranged in cycles, so that each is the envelope of a chord of constant length taken upon the succeeding curve of the cycle.

A solution of this problem appears on pages 371-373 of this issue of the MONTHLY.

## NOTES AND NEWS.

It is to be hoped that readers of the MONTHLY will coöperate in contributing to the general interest of this department by sending items to H. P. MANNING, Brown University, Providence, R. I.

MISS GERTRUDE I. MCCAIN, of Oxford College, has been made professor of mathematics at Westminster College, New Wilmington, Pa.

Associate Professor J. V. MCKELVEY decided to remain at Iowa State College (compare 1921, 285).

We are requested to state that our note regarding Associate Professor W. A. WILSON's promotion (1921, 332) is not in accordance with fact.

At the University of Michigan, Mr. J. P. BALLANTINE, of Pennsylvania State College, and Mr. W. M. COATES, of the University of Virginia, have been appointed instructors of mathematics.

Mr. J. C. FUNK, of Tamalpais Polytechnic High School, Mill Valley, Cal., has been elected to the headship of the department of mathematics in the Santa Maria high school and junior college.

Associate Professor EMMA L. KONANTZ, who has spent two years on leave of absence teaching in Peking University, has returned to her position at Ohio Wesleyan University.

Mr. H. K. CUMMINGS, instructor of physics at the Worcester Polytechnic Institute, and experimental physicist in the research laboratories of the Acheson Graphite Company, has been appointed instructor of mathematics at Brown University.

Mr. F. W. WINTERS, of Mount Allison University, but recently a student instructor at Yale University, has been appointed assistant professor of mathematics at Dalhousie College, Halifax, Nova Scotia.

Assistant Professor J. D. BOND, of the Agricultural and Mechanical College, College Station, Texas, has been appointed associate professor of mathematics in the Louisiana State University.

Mrs. ETHELWYNN R. BECKWITH, formerly assistant professor of mathematics in the College for Women, Western Reserve University, has been appointed acting assistant professor of mathematics in Vassar College.

Dr. F. R. MORRIS, for three years instructor of mathematics in the University of California, has been appointed head of the department of mathematics in the State College of Fresno, which has been recently formed from the normal school and junior college, and which is working under the supervision of the university.

*Publications of the Astronomical Society of the Pacific* announces that Dr. H. M. JEFFERS, of the University of California, fellow at the Lick Observatory during 1920, passed examinations for the doctorate last January, and has since that time been instructor of mathematics and astronomy at the University of Iowa.

Mr. C. P. ROCKWELL, who studied pure and applied mathematics at the University of Texas, and after graduating at New York University was employed two years in the actuarial department of one of the large insurance companies, has been reappointed state actuary of the Texas department of insurance and banking.

At the University of Saskatchewan, Saskatoon, Professor G. H. LING has resumed his duties as professor of mathematics and dean of the Faculty of Arts [see 1920, 437]. Dr. L. L. DINES, who has been a junior professor of mathematics [1919, 84; also 1914, 343], was on July 1, 1921, promoted to a senior professorship. He has also been granted leave of absence for the second half of the academic year 1921-1922.

At Purdue University, Professor WILLIAM MARSHALL has been made acting head of the department of mathematics. Instructors C. S. DOAN and F. H. HODGE have been promoted to assistant professorships and Messrs. J. W. BRANSON, E. G. KELLER, J. J. KNOX, and J. H. SHOCK have been appointed to instructorships. The mathematics staff now consists of twenty-one men. Approximately eighteen hundred students are taking mathematics.

THEODORE LYMAN, who (except for service with the A. E. F.) has been teaching at Harvard University since 1902, has been appointed professor of mathematics and natural philosophy. His immediate predecessors in this chair were B. O. PEIRCE, 1888-1914, and W. C. SABINE, 1914-1919. Dr. Lyman has been director of the Jefferson Physical Laboratory since 1910, and was appointed professor of physics in 1917.

In the department of mathematics at the U. S. Naval Academy, Assistant Professor H. M. ROBERT, Jr., has been promoted to an associate professorship and Instructors G. F. ABRICH, R. P. JOHNSON, R. C. LAMB, E. S. MAYER, and J. B. SCARBOROUGH have been promoted to assistant professorships. Dr. G. H. CRESSE (cf. 1919, 276, 420) has resigned from the staff to accept an associate professorship at the University of Arizona, and Mr. C. D. GREGORY, formerly

of the faculty at Baltimore Polytechnic Institute, and last year a graduate student at the Johns Hopkins University, has been appointed to an instructorship. The 1975 midshipmen in the three classes that receive instruction in mathematics at the Academy are handled in 140 sections.

It was announced in *Science* that R. A. MILLIKAN, professor of physics at the University of Chicago, has been appointed director of the Norman Bridge Laboratory of Physics at the California Institute of Technology, Pasadena, and chairman of the Executive Council of the Institute. He will commence his duties immediately. In order to supplement work in mathematical physics now carried on there by Professor HARRY BATEMAN, Professor H. A. LORENTZ, of the University of Leyden, will be a lecturer and research associate for two months next winter, and Dr. C. G. DARWIN, fellow and lecturer of Christ's College, Cambridge, has been appointed professor of mathematical physics at the Institute for the year 1922-1923.

Dr. HENRI LEBESGUE, recently professor at the University of Paris, has been appointed as successor to HUMBERT (1921, 237), professor of mathematics in the Collège de France.

HOWARD ROBERTSON PARK, who became a member of the Association in 1918 (1918, 381), died November 12, 1919. He was born at Mount Meigs, Ala., June 28, 1891, and graduated A.B., 1910, from Southern University, where he taught during his senior year. He attended the University of Texas, 1911-12, and summer sessions of the University of Chicago, 1916-1918. He taught in high schools of Texas, New Mexico and California before his appointment in September, 1917, as head of the department of mathematics in the Polytechnic High School, Riverside, Cal. This position he held at the time of his death.

ANNA IRWIN YOUNG, for twenty years head of the department of mathematics in Agnes Scott College, Decatur, Ga., and a charter member of our Association, died September 3, 1920. She was born in Bloom Township (now Chicago Heights), Illinois, November 25, 1873. As a student she attended Westminster College, Pa., 1892-1893; Agnes Scott Institute, Atlanta, 1893-1895; and the summer school of the University of Chicago in 1898 and 1901. In 1898 she received the degree of A.B. from Agnes Scott College, and in 1914 the degree of A.M. from Columbia University. She taught during two summers in the summer school of the University of Georgia.

GEORGE WENTWORTH, one of the authors of the Wentworth-Smith Mathematical Series, died suddenly of heart disease on August 26, 1921. He was born at Exeter, N. H., on January 8, 1868, and was the son of GEORGE A. WENTWORTH (1835-1906), author of the well-known textbooks which bore the Wentworth name, and who for a long time was at the head of the mathematics department of the Phillips Exeter Academy. George Wentworth prepared for college at Exeter and entered Harvard University. In his senior year he left college and took up commercial work in the West, but he later returned to join his father in the writing of mathematical textbooks. He developed great ability in the technique

of this work, and on his father's death he purchased the Wentworth series. In 1913 he and Professor D. E. Smith entered into partnership and founded the Wentworth-Smith Series.

Rev. JOHN BASCOMBE LOCK, fellow and bursar of Gonville and Caius College, Cambridge, England, died September 8, 1921. Born March 18, 1849, he was third wrangler in the mathematical tripos of 1872, assistant master at Eton, 1872-1884, lecturer on mathematics and tutor at Caius College, 1884-1889. He was the author of many well-known texts in arithmetic, geometry, trigonometry, and mechanics.

Colonel JOHN HERSCHEL, youngest son of Sir JOHN F. W. HERSCHEL, died on May 31, 1921, and he was buried at Upton church where lie the remains of his grandfather WILLIAM HERSCHEL; his father was buried at Westminster Abbey. He was born at Cape of Good Hope, October 29, 1837. From 1859 to 1886 he was connected with the Trigonometrical Survey of India, and the Royal Society employed him to observe spectroscopically the eclipses of the sun in 1868 and 1871. He also observed many of the southern nebulae with the same instruments.

Dr. EMILE BOREL, professor of calculus of probabilities and mathematical physics at the University of Paris, who has received the degree "doctor honoris causâ" from the University of Dublin, is the first Frenchman to be so honored. A Canadian, two Scots and two Irishmen have received similar degrees, but in each case the award was to a man of letters.

The Smith's Prizes at Cambridge University this year have been awarded to L. A. PARS, Jesus College, for an essay on "The general theorem of relativity," and to W. M. H. GREAVES, St. John's College, for an essay on "Periodic orbits in the problem of three bodies." These two annual prizes, now amounting to about £ 23 each, were founded by Robert Smith (1689-1768), master of Trinity College, elected in 1716 to succeed Cotes as Plumian professor of astronomy at Cambridge. They have been awarded annually, since 1769, except in 1884, to "two commencing Bachelors of Arts, the best proficient in mathematics and natural philosophy," determined by essays of greatest merit. New regulations were promulgated in 1884, and again in 1909 when Raleigh prizes were awarded on a similar basis. H. BATEMAN was a Smith's prizeman for 1905, J. H. JEANS for 1901, and R. C. MACLAURIN for 1897.

On May 17, 1921, Dr. O. D. KELLOGG, associate professor of mathematics at Harvard University, lectured before the Providence Engineering Society on "Submarine listening devices."

Professors G. D. BIRKHOFF and L. E. DICKSON are to lecture in the summer school of the University of California in 1922.

We have recently made numerous references to the activities of Professor SOLOMON LEFSCHETZ, of the University of Kansas (1920, 339, 340, 436, 440; 1921, 241, 288, 384). His lectures at the University of Rome, in April and early

May, 1921, were on "Analysis situs and algebraic geometry," and are to form the basis of a monograph due to appear in the Borel series.

Among the papers read at the twenty-sixth meeting of the American Astronomical Society, held at the Van Vleck Observatory, Middletown, Conn., August 30-September 1, 1921, were the following: "New measures of solar activity and the 'earth-effect'" by L. A. BAUER; "A theory for the Trojan group of asteroids" by E. W. BROWN; "Gilbert's bombardment hypothesis" by J. L. COOLIDGE; "Parallaxes of 65 stars" by J. A. MILLER.

At meetings of the Royal Society of Canada, mathematical, physical and chemical section, held at Ottawa, May 18-20, 1921, the papers presented included the following: "Division in relation to the algebraic numbers," presidential address by J. C. FIELDS; "On the reduction of the circulants to polynomial form with applications to the circulants of the 7th and 11th degrees" by J. C. GLASHAN; "The gravitation potential of an anchor ring; some tidal problems" by A. H. S. GILLSON; "The solution of plane triangles by nomographic charts" by S. D. KILLAM; "Note on the geometrical equivalent of certain invariants" by C. T. SULLIVAN.

On October 24, 1921, a bill to incorporate the American Mathematical Society in the District of Columbia was introduced into the Senate of the United States by Mr. Lodge. It was twice read and referred to the committee of the judiciary. —*Congressional Record*, October 24, 1921.

In order to provide an enduring memorial for the 127 Field Service men who lost their lives in the great war, American Field Service Fellowships for French Universities were established (compare 1921, 44). The fellowships for 1922-23, not to exceed 25 in number, are tenable for one year by citizens of the United States, and are to be of the value of \$200 plus 10,000 francs. Under certain circumstances the fellowships are renewable a second year. The 31 fields of study possible for fellows include Mathematics, Engineering, and Astronomy. Prospective applicants for these fellowships should communicate with the secretary of the Trustees, Dr. I. L. Kandel, 522 Fifth Avenue, New York City. The next awards are to be made early in 1922.

The University of Rome has become one of the great mathematical centers of the world through the following recent appointments to its chairs: FEDERIGO ENRIQUES, of the University of Bologna, FRANCESCO SEVERI, of the University of Padua, and GIUSEPPE BAGNERA, of the University of Palermo. VITO VOLTERRA, GUIDO CASTELNUOVO, and TULLIO LEVI-CIVITA, were already professors there.